

WE CLAIM:

1. A contactless acceleration switch system, comprising in combination:
  - a substrate layer containing a source, a drain, and a threshold adjustment channel;
  - a gate insulating layer located substantially above the source, the drain,  
5 and the threshold adjustment channel;
  - at least two insulator posts, wherein the source, the drain, the threshold adjustment channel, and the gate insulating layer are located substantially between the at least two insulator posts;
  - a mass; and
  - 10 a spring substantially supporting the mass above the substrate layer, wherein the spring is attached to each of the at least two insulator posts.
2. The system of Claim 1, wherein the substrate layer is composed of a semiconductor material.
3. The system of Claim 2, wherein the semiconductor material is silicon.
4. The system of Claim 1, wherein the gate insulating layer is composed of silicon dioxide.
5. The system of Claim 1, wherein the at least two insulator posts are composed of

an insulating material.

6. The system of Claim 5, wherein the insulating material is silicon dioxide.
7. The system of Claim 1, wherein the mass is composed of an electrically conductive material.
8. The system of Claim 7, wherein the electrically conductive material is doped silicon.
9. The system of Claim 1, wherein the spring is composed of an electrically conductive material.
10. The system of Claim 9, wherein the electrically conductive material is doped silicon.
11. The system of Claim 1, wherein the threshold adjustment channel is doped to a level to cause the threshold adjustment channel to invert when the mass moves substantially towards the substrate layer.
12. The system of Claim 1, wherein the gate insulating layer substantially limits electric conduction between the mass and the substrate layer.

13. The system of Claim 1, wherein the mass operates as a moveable gate.
14. The system of Claim 1, wherein the mass, the source, and the drain operate as a field effect transistor.
15. The system of Claim 1, wherein an air gap is located substantially between the mass and the substrate layer when an acceleration level is substantially below a threshold acceleration value.
16. The system of Claim 1, wherein the mass moves substantially towards the substrate layer when a threshold acceleration value is detected.
17. The system of Claim 16, wherein the threshold adjustment channel inverts when the mass moves towards the substrate layer.
18. The system of Claim 17, wherein current flows between the source and the drain when the threshold adjustment channel inverts.
19. The system of Claim 1, wherein the source and the drain act as electrodes providing an electrical signal that indicates that a threshold acceleration value is detected.

20. The system of Claim 1, wherein a substantially constant voltage is applied between the mass and the substrate layer.

21. The system of Claim 20, wherein the substantially constant voltage is determined by factors selected from the group consisting of mass size, spring constant, operation range, and hysteresis.

22. A contactless acceleration switch system, comprising in combination:

a silicon substrate layer containing a source, a drain, and a threshold adjustment channel, wherein the threshold adjustment channel is doped to a level to cause the threshold adjustment channel to invert when a mass moves substantially towards the silicon substrate layer, and wherein the source and the drain act as electrodes providing an electrical signal that indicates that a threshold acceleration value is detected;

a gate insulating layer located substantially above the source, the drain, and the threshold adjustment channel, wherein the gate insulating layer is composed of silicon dioxide, and wherein the gate insulating layer substantially limits electric conduction between the mass and the silicon substrate layer;

at least two insulator posts composed of silicon dioxide, wherein the source, the drain, the threshold adjustment channel, and the gate insulating layer are located substantially between the at least two insulator posts;

the mass composed of doped silicon, wherein the mass operates as a

moveable gate, wherein the mass, the source, and the drain operate as a field effect transistor, wherein an air gap is located substantially between the mass and the silicon substrate layer when an acceleration level is substantially below the threshold acceleration value, wherein the mass moves substantially towards the silicon substrate layer when the threshold acceleration value is detected, wherein the threshold adjustment channel inverts when the mass moves towards the silicon substrate layer, wherein current flows between the source and the drain when the threshold adjustment channel inverts, and wherein a substantially constant voltage is applied between the mass and the silicon substrate layer; and

a spring composed of doped silicon substantially supporting the mass above the silicon substrate layer, wherein the spring is attached to each of the at least two insulator posts.

23. A method for making a contactless acceleration switch, comprising in combination:

implanting a source, a drain, and a threshold adjustment channel in a substrate layer, and wherein the threshold adjustment channel is located substantially between the source and the drain;

forming at least two insulator posts on the substrate layer, and wherein the source, the drain, and the threshold adjustment channel are located substantially between the at least two insulator posts;

forming a first sacrificial layer on the substrate layer substantially between

- 10        the at least two insulator posts;
- forming a mass on the first sacrificial layer;
- forming a second sacrificial layer shaped to provide a pattern for forming
- a spring;
- forming the spring;
- 15        removing the first sacrificial layer and the second sacrificial layer, and
- wherein the spring holds the mass substantially above the substrate layer; and
- forming a gate insulating layer.
24.      The method of Claim 23, wherein the substrate layer is composed of a
- semiconductor material.
25.      The method of Claim 24, wherein the semiconductor material is silicon.
26.      The method of Claim 23, wherein ion implantation is used to implant the source,
- the drain, and the threshold adjustment channel in the substrate layer.
27.      The method of Claim 23, wherein the threshold adjustment channel is doped to a
- level to cause the threshold adjustment channel to invert when the mass moves
- substantially towards the substrate layer.
28.      The method of Claim 23, wherein the at least two insulator posts are composed of

an insulating material.

29. The method of Claim 28, wherein the insulating material is silicon dioxide.
30. The method of Claim 23, wherein the at least two insulator posts are thermally grown.
31. The method of Claim 23, wherein wet etching is used to form the at least two insulator posts.
32. The method of Claim 23, wherein the first sacrificial layer is composed of a material selected from the group consisting of silicon dioxide, polyimide, photoresist, polymer, doped silicon, and metal.
33. The method of Claim 23, wherein the first sacrificial layer is composed of silicon dioxide.
34. The method of Claim 23, wherein the first sacrificial layer is thermally grown.
35. The method of Claim 23, wherein wet etching is used to form the first sacrificial layer.

36. The method of Claim 23, wherein the mass is composed of an electrically conductive material.
37. The method of Claim 36, wherein the electrically conductive material is doped silicon.
38. The method of Claim 23, wherein the mass is deposited using low pressure chemical vapor deposition.
39. The method of Claim 23, wherein plasma etching is used to form the mass.
40. The method of Claim 23, wherein the second sacrificial layer is composed of a material selected from the group consisting of silicon dioxide, polyimide, photoresist, polymer, doped silicon, and metal.
41. The method of Claim 23, wherein the second sacrificial layer is composed of silicon dioxide.
42. The method of Claim 23, wherein low temperature oxidation is used to deposit the second sacrificial layer.
43. The method of Claim 23, wherein wet etching is used to form the second



sacrificial layer.

44. The method of Claim 23, wherein the spring is composed of an electrically conductive material.

45. The method of Claim 44, wherein the electrically conductive material is doped silicon.

46. The method of Claim 23, wherein low pressure chemical vapor deposition is used to deposit the spring.

47. The method of Claim 23, wherein plasma etching is used to form the spring.

48. The method of Claim 23, wherein wet etching is used to remove the first sacrificial layer and the second sacrificial layer.

49. The method of Claim 23, wherein the gate insulating layer is composed of an insulating material.

50. The method of Claim 49, wherein the insulating material is silicon dioxide.

51. The method of Claim 23, wherein the gate insulating layer is thermally grown.

52. A method for making a contactless acceleration switch, comprising in combination:

implanting a source, a drain, and a threshold adjustment channel in a silicon substrate layer using ion implantation, wherein the threshold adjustment channel is located substantially between the source and the drain, and wherein the threshold adjustment channel is doped to a level to cause the threshold adjustment channel to invert when a mass moves substantially towards the silicon substrate layer;

forming at least two silicon dioxide insulator posts on the silicon substrate layer, wherein the at least two silicon dioxide insulator posts are thermally grown, wherein wet etching is used to form the at least two silicon dioxide insulator posts, and wherein the source, the drain, and the threshold adjustment channel are located substantially between the at least two silicon dioxide insulator posts;

forming a first sacrificial layer composed of silicon dioxide on the silicon substrate layer substantially between the at least two silicon dioxide insulator posts, wherein the first sacrificial layer is thermally grown, and wherein wet etching is used to form the first sacrificial layer;

forming the mass composed of doped silicon on the first sacrificial layer, wherein the mass is deposited using low pressure chemical vapor deposition, and wherein plasma etching is used to form the mass;

forming a second sacrificial layer composed of silicon dioxide shaped to

provide a pattern for forming a spring, wherein low temperature oxidation is used to deposit the second sacrificial layer, and wherein wet etching is used to form the second sacrificial layer;

25                forming the spring composed of doped silicon, wherein low pressure chemical vapor deposition is used to deposit the spring, and wherein plasma etching is used to form the spring;

                 removing the first sacrificial layer and the second sacrificial layer using wet etching, wherein the spring holds the mass substantially above the silicon  
30                substrate layer; and

                 forming a gate insulating layer composed of silicon dioxide, and wherein the gate insulating layer is thermally grown.